

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (currently amended) An apparatus for continuous casting of molten metals, the molten metal being continuously cast using a casting mold, said apparatus comprising:

electromagnets each comprising an iron core and a coil wound over said iron core,

said electromagnets being arranged in a facing relation on opposite sides of said mold along a transverse width thereof to lie side by side along a longitudinal width of said mold; and

a single-phase AC current power supply connected to each coil and structurally configured to supply a single-phase AC current to each coil such that every pair of the electromagnets lying side by side next to each other have a phase difference of 0° or 180° to induce only vibrating flows.

2. (original) The apparatus according to claim 1, wherein said iron core comprises individual single iron cores separate from each other, or a comb-shaped iron core having a comb-teeth portion over which the coils are wound.

3. (original) The apparatus according to claim 1, wherein said iron core comprises a comb-shaped iron core having a comb-teeth portion over which said coils are wound and a root portion over which a second coil is wound, and further comprising a means for supplying a DC current to the second coil.

4. (currently amended) An apparatus for continuous casting of molten metals, the molten metal being continuously cast using a casting mold, said apparatus comprising:

a coil supplied with a DC current for producing a DC magnetic field and plural coils supplied with a single-phase AC current for producing a non-moving, vibrating magnetic field, both of said coils being wound over each of common iron cores,

said iron cores being arranged around said mold such that a direction of the magnetic fields produced by said coils is aligned with a transverse width of said mold, wherein,

said single-phase AC current is supplied from a single-phase AC current power supply connected to each coil, and

said single phase AC current power supply is connected to said coils and structurally configured such that the AC currents supplied to every pair of the coils lying side by side next to each other have the phase differences of 0° or 180° to induce only vibrating flows.

5. (previously presented) The apparatus according to claim 4, wherein magnetic poles of said iron core are arranged in at least one pair to face each other above and/or below an ejection port of an immersion.

6-14. (canceled)

15. (previously presented) The apparatus according to claim 1, wherein said single-phase AC current power supply is capable of providing only single-phase AC current.

16. (canceled)

17. (previously presented) The apparatus according to claim 1, wherein each pair of adjacent coils for single-phase AC current on the same side of the mold have phase differences of 0° .

18. (previously presented) The apparatus according to claim 4, wherein each pair of adjacent coils for single-phase AC current on the same side of the mold have phase differences of 0° .

19. (previously presented) The apparatus according to claim 1, wherein each pair of adjacent coils for single-phase AC

current on the same side of the mold have phase differences of 180°.

20. (previously presented) The apparatus according to claim 4, wherein each pair of adjacent coils for single-phase AC current on the same side of the mold have phase differences of 180°.

21. (currently amended) An apparatus for continuous casting of molten metals, the molten metal being continuously cast using a casting mold, said apparatus comprising:

a first row of electromagnets arranged along a longitudinal width of a casting mold, each electromagnet comprising an iron core and a coil wound over said iron core;

a second row of electromagnets arranged along the longitudinal width of said casting mold in a facing relation with the first row of electromagnets on opposite sides of said mold along a transverse width of said mold, each electromagnet of said second row comprising an iron core and a coil wound over said iron core; and

a single-phase AC current power supply connected to the coils of said first and second rows of electromagnets and structurally configured such that an AC current supplied to every coil of the first and second rows of electromagnets has a phase

difference of 0° or 180° to the AC current supplied to an immediately adjacent coil to induce only vibrating flows.

22. (currently amended) The apparatus of claim 1,
wherein,

said electromagnets arranged in a facing relation on opposite sides of said mold along a transverse width thereof to lie side by side along a longitudinal width of said mold comprise i) at least a first electromagnet on a first of said sides, a second electromagnet immediately adjacent the first electromagnet, and a third electromagnet immediately adjacent the second electromagnet, and ii) at least a fourth electromagnet on a second of said sides, a fifth electromagnet immediately adjacent the fourth electromagnet, and a sixth electromagnet immediately adjacent the fifth electromagnet,

the first electromagnet is opposite the fourth electromagnet, the second electromagnet is opposite the fifth electromagnet, and the third electromagnet is opposite the sixth electromagnet,

said single-phase AC current power supply is connected to each coil of said first through sixth electromagnet and configured to supply a single-phase AC current to each of said coils such that a phase difference between every coil and the immediately adjacent coil is 0° or 180° , and

the coil of the first electromagnet and the coil of the fourth electromagnet are wound in the same first direction (x, x),

the coil of the second electromagnet and the coil of the fifth electromagnet are wound in the same second direction (y, y), the first direction being opposite to the second direction,

the coil of the third electromagnet and the coil of the sixth electromagnet are wound in the same first direction (x, x),

the single-phase AC current supplied from said single-phase AC current power supply to each of the coils of said first through sixth electromagnets develops magnetic forces between every two electromagnets arranged adjacent to each other on the same side that are reversed in direction repeatedly over time to inducing only vibrating flows (10) in a direction of longitudinal width of the mold.

23. (currently amended) The apparatus of claim 1, wherein,

said electromagnets arranged in a facing relation on opposite sides of said mold along a transverse width thereof to lie side by side along a longitudinal width of said mold comprise i) at least a first electromagnet on a first of said sides, a second electromagnet immediately adjacent the first electromagnet, and a third electromagnet immediately adjacent the

second electromagnet, and ii) at least a fourth electromagnet on a second of said sides, a fifth electromagnet immediately adjacent the fourth electromagnet, and a sixth electromagnet immediately adjacent the fifth electromagnet,

the first electromagnet is opposite the fourth electromagnet, the second electromagnet is opposite the fifth electromagnet, and the third electromagnet is opposite the sixth electromagnet,

said single-phase AC current power supply is connected to each coil of said first through sixth electromagnet and configured to supply a single-phase AC current to each of said coils such that a phase difference between every coil and the immediately adjacent is coil 0° or 180° , and

the coils of the first through third electromagnets are wound in the same first direction (x, x, x),

the coils of the fourth through sixth electromagnets are wound in the same second direction (y, y, y), the first direction being opposite to the second direction,

the single-phase AC current supplied from said single-phase AC current power supply to each of the coils of said first through sixth electromagnets develops magnetic forces between every two electromagnets arranged opposite to each other on different sides of the mold that are reversed in direction repeatedly over time to induce inducing only vibrating flows (20) in a direction [[of]] transverse to a width of the mold.